

WHAT IS CLAIMED IS:

1. A method of providing a single line frequency rate operation between node elements (NEs) of a communication transmission network that is capable of receiving a multitude of different client signals of different payload types with different client signal payload rates which client signals are propagated at the single line frequency rate between NEs of the network, comprising the steps of:

providing a constant line rate between node elements regardless of the client signal payload rates;

establishing at a node element an overhead ratio (OHR) between the line rate and an effective payload rate where the effective payload rate is determined from a payload offset size from an actual client signal payload size for a particular client signal payload type;

buffering ingress of the client signals at node element where the client signal payload is clocked into the node element at the higher line frequency rate and clocked within the node element at the client signal payload rate; and

utilizing the established effective payload rate at the node element to generate the client signal payload clock for clocking the client signals through the node element at the client signal payload rate.

2. The method of claim 1 wherein the line rate is a higher frequency than the client signal payload rate.

3. The method of claim 1 wherein the step of buffering is performed with the use of a first FIFO buffer or a first delay line.

4. The method of claim 1 comprising the further steps of:

buffering egress of the client signals out of the node element where the client signal payload is clocked out of the node element from the lower client signal payload clock into the higher line rate for output from the node element.

5. The method of claim 4 wherein the step of buffering is performed with the use of a second FIFO buffer or a second delay line.

6. A method for the handling of different client signal protocols having different payload envelopes and payload rates between node elements in a transmission network, comprising the steps of:

propagating all client signals having different payload envelopes and rates between node elements of the network all at a same first frequency; and

asynchronously mapping the client signals received at a node element from the first frequency into a second frequency generated at the node element by a local non-crystal clock.

7. The method of claim 6 comprising the further step of asynchronously mapping the client signals at a second frequency at an end terminal or node into the first frequency; and

propagating all the remapped client signals to another node or end terminal.

8. The method of claim 6 wherein the second frequency is a payload frequency of a respective client signal dependent upon the client signal's payload type.

9. The method of claim 6 wherein the second frequency is a payload frequency of the client signal.

10. The method of claim 6 wherein the second frequency is generated at the node by a reference frequency clock.

11. The method of claim 6 comprising the further step of:

receiving a client signal at the line frequency in a node;

determining an overhead ratio (OHR) from data in the overhead associated with the received client signal;

determining from the OHR an effective payload rate; and

determining the client payload rate for the client signals from the effective payload rate and frequency justification bytes provided with the client signal overhead.

12. The method of claim 6 further comprising the step of distributing client signal FEC encoding along each payload frame of the client signal to reduce the size of circuit requirements to perform the step of asynchronously mapping.

13. The method of claim 12 wherein the circuitry size reduction is achieved through employment of a smaller size FIFO buffer or line delay.

14. The method of claim 6 wherein the first frequency is a line rate between node elements and the second frequency is a client signal payload rate determined from the overhead ratio and the line frequency rate.

15. The method of claim 6 wherein the first frequency is a line rate between node elements and the second frequency is a client signal payload rate determined from an effective payload rate and frequency justification accompanying the client signal.

16. Apparatus for operating a transmission network asynchronously relative to client signals having a predetermined payload type and where the line rate is the same between node elements of the network regardless of client signal payload type and rate, comprising:

means to establish a variable overhead ratio (OHR) that varies with respect to different client signal payload types, said overhead ration (OHR) determined by the formula,

$$OHR = \frac{\text{Client Frame Size}}{\text{Client Payload Size} - \text{Payload Offset Size}}$$

where the payload offset size is determined by a difference between a client signal payload envelope size and an effective payload envelope size;

means to establish an effective payload rate from the line rate and the overhead ration (OHR);

the client payload rate determined from the effective payload rate and frequency justification representative of the difference between the effective payload size and the original client signal payload size; and

delay means to clock and remap the client signal through the node element by converting the clocking rate of the client signal from the line rate to the client signal payload rate.

17. The apparatus of claim 16 wherein the delay means comprises a client signal buffer.

18. The apparatus of claim 17 wherein said buffer is a FIFO or a delay line.

19. The apparatus of claim 16 effective payload size has a effective payload rate greater than the original client signal payload rate, said effective payload size established by insertion of

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skipped bytes in payload groups comprising the client signal payload in each client signal payload frame which skipped bytes are ignore by logic circuitry.

20. The apparatus of claim 16 wherein FEC encoding bytes are distributed along the client signal payload in each client signal payload frame which permits a reduction in physical size required for said delay means.